

Black River Bridge
Spanning Black River at Grand Avenue
Neillsville Vicinity
Clark County
Wisconsin

HAER No. WI-76
HAER
WIS
10-NEIL,
1-

PHOTOGRAPHS
WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Rocky Mountain Regional Office
P.O. Box 25287
Denver, Colorado 80225

HISTORIC AMERICAN ENGINEERING RECORD

BLACK RIVER BRIDGE

HAER
WIS
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1-

Location: Spanning the Black River at Grand Avenue
Neillsville Vicinity, Clark County, Wisconsin

USGS Neillsville Quadrangle, Universal Transverse Mercator Coordinates:
Zone 15 Easting 690740 Northing 4937780

Present Owner: State of Wisconsin

Present Use: Vehicular bridge

Significance: The Black River Bridge is significant and eligible for the National Register under Criterion C. Resembling a Pony Truss in design, it is an example of a Deep Beam bridge with holes that utilizes reinforced concrete for its structural components.¹ Bridges of this type (concrete or Deep Beam) are not discussed in Cultural Resource Management in Wisconsin, nor have they been systematically surveyed. Consequently, attempts were made to determine if similar bridges exist in the state. None apparently does.² Therefore, with its massive, concrete structural members, Deep Beam design and Pony Truss appearance, this bridge is a unique technological artifact in Neillsville, as well as in the State of Wisconsin.

PART I. HISTORICAL INFORMATION

A. Physical History:

1. Date of erection: 1921³
2. Architect: J.H.A. Brahtz⁴

¹The identification of this structure as a Deep Beam bridge with holes was tentatively made by William G. Murphy, former chairman of the Civil Engineering Department at Marquette University.

²Neither Robert S. Newbery, WisDOT Historian, nor Stan Woods, Chief Bridge Engineer for WisDOT, is aware of any similar bridges.

³"New Bridge is Accepted," Neillsville Press, 13 October 1921.

⁴An engineer in St. Paul, Minnesota, this was the person from whom interested contractors could obtain plans and

3. Original and subsequent owners: Public ownership
4. Builders, suppliers:
 - a. Builders: Unknown
 - b. Suppliers: Unknown
5. Alterations and additions: Two lamps were originally located at each end of the structure. They are no longer extant.

B. Historical Context:

Historical Background:

Early settlers in Clark County were involved with the lumber industry. Generally, the county is within the Black River flowage where lumber production reached forty million board feet in 1860-1861.⁵

The lumber industry in northern Wisconsin flourished well into the 1880s. But by 1890, it was clear that timber supplies were dwindling, and by 1900, the industry was largely gone. As the lumbermen pulled out, leaving a vast cut-over region, aspiring agriculturalists moved in. The situation looked good for farmers coming to the region. They would not have to clear land, and soil reports were favorable. Clark County soil was described as "admirably adapted to the cultivation of cereals and vegetables...."⁶

The number of farms in the county grew rapidly, as did the number of acres in cultivation. While there were 357 farms with 55,914 acres planted in 1870, there were 2,474 farms cultivating 185,697 acres in 1890 and 3,549 utilizing 411,825 acres

specifications for the proposed bridge. It is logical to conclude, consequently, that he designed the structure. It should be noted that no plans for the bridge were located, nor were any specific references to a designer. "Specifications for Reinforced Concrete Girder Bridge Across the Black River, Neillsville, Wis.," Republican and Press, 31 March 1921.

⁵History of Northern Wisconsin (Chicago: Western Historical Company, 1881), 228; Frederick Merk, Economic History of Wisconsin During the Civil War Decade (Madison: State Historical Society of Wisconsin, 1916; Reprint, 1971), 64.

⁶Northern Wisconsin, 227.

in 1910. Agricultural acreage reached 581,111 by 1945.⁷ [Note that total acreage in Clark County is 777,990.⁸]

The Clark County cut-over is in a region that came to be known as the "New North." The state took an active role in settling the region in 1895, when it created the State Board of Immigration. The Board then produced and distributed a book entitled Northern Wisconsin, A Handbook for the Home Seeker, which has been called "the most valuable single source of information in regard to northern Wisconsin at that time." Efforts to colonize the New North were generally successful. By 1920, Clark County had a population of 5,927, of which 2,089 were Germans, 1,000 were Poles and 422 were Norwegians.⁹

It was in this larger context that the City of Neillsville evolved. The community's first settler, and the man after which it was named, was James O'Neill. Arriving in 1845 with two other men, O'Neill built a cabin on a creek adjacent to the Black River. Immediately after the cabin was finished, the men built a mill capable of sawing 4,000 feet of lumber in a twelve-hour period. Settlement occurred slowly, but enough people had arrived in Neillsville to justify naming the community the Clark County seat in 1854 and then platting it in 1855. By 1860, its population was about 250. Lumber and logs were identified as the community's primary exports in 1879, a year in which Neillsville's population was estimated at 1,500.¹⁰

Neillsville's evolution from a lumber-oriented town to one that focused more on agriculture was evident by 1886, when its principal shipments were lumber, staves and heading and livestock. The evolution continued, and the town was described in 1891 as the "receiving and distributing point for the large lumber and agricultural district tributary...." As well, it was noted that "the soil of the surrounding country is a rich clay loam, [e]specially adapted for agricultural purposes...." Further, land could be bought for between \$10 and \$60 an acre, a fact that undoubtedly drew people to the

⁷A Century of Wisconsin Agriculture, 1848-1948 (Madison: Wisconsin Crop and Livestock Reporting Service, 1948), 87.

⁸State of Wisconsin: 1985-1986 Blue Book (Madison: State of Wisconsin, 1985), 711.

⁹Joseph Schafer, A History of Agriculture in Wisconsin (Madison: State Historical Society of Wisconsin, 1922), 137.

¹⁰Northern Wisconsin, 228-29, 231, 234, 235; Wisconsin State Gazetteer and Business Directory, 1879 (Milwaukee: William Hogg, 1879), 370.

town which, by 1900, included 2,104 residents.¹¹ By 1918, Neillsville was considered an important central place (trade center) for "an important agricultural dairying and stock-raising district."¹²

Given the lumber and agriculturally-oriented industries that Neillsville served, it is logical to assume that the town had to be accessible to as much of the surrounding countryside as possible. And since the town was just south of the Black River, the territory to the north would not be accessible without a bridge.

The first Black River Bridge at Grand Avenue appears to have been built between 1880 and 1893.¹³ It is uncertain if the bridge in existence in 1920 was the original one, or if it was a replacement. However, it is known that the bridge collapsed in the summer of 1920, killing John Verkullen, a county truck driver. Plans for a replacement structure evolved, and in February 1921, the city council authorized a bond sale to raise the necessary money. A month later, contractors were asked to bid "for the furnishing of all labor, skill, material and equipment therefor and for the construction, erection and completion in a good and workmanlike manner of a reinforced concrete bridge to consist of three reinforced concrete spans, concrete piers, and abutments."¹⁴ The bridge was completed in October and cost over \$31,000. Apparently, city officials were quite concerned about the structural integrity of this bridge -- given that its predecessor collapsed -- because it was not opened to traffic until two steam rollers drove over it side-by-side. Indeed, it was noted that "the weight of the two rollers was 24 ton [sic] and the bridge seemed to have stood the test in excellent manner."¹⁵

Engineering:

Although this structure resembles a Pony Truss, it is a Deep Beam bridge with holes.

¹¹Wisconsin State Gazetteer and Business Directory, 1891-1892 (Chicago: R.L. Polk & Co., 1891), 770; Polk's Wisconsin State Gazetteer and Business Directory, 1901-1902 (Chicago: R.L. Polk and Co., 1901), 811.

¹²Franklyn Curtiss-Wedge, comp., History of Clark County, Wisconsin (Chicago: H.C. Cooper, Jr., & Co., 1918), 627.

¹³Map of the County of Clark, Wisconsin (Neillsville, WI: Charles E. Bussell, 1880), map; Clark County Plats, 1893 (Neillsville, WI: C.S. Stockwell, 1893), map.

¹⁴"Will Sue City and Town Pine Valley," Neillsville Press, 24 November 1921; "City Ordinance No. 457," Republican and Press, 17 February 1921; "Specifications for Reinforced Concrete Girder Bridge Across the Black River."

¹⁵"New Bridge is Accepted."

In a conventional truss bridge, the upper and lower chords and the verticals and diagonals are utilized to create a series of triangles that carries the load of the structure and the vehicles that cross it. By contrast, a Deep Beam bridge utilizes only, what are in effect, an upper chord and a lower chord. The load is carried horizontally, and in opposite directions by the parallel chords. Unlike the conventional truss, the vertical members in a Deep Beam structure are really only "spacers" that maintain the placement of the parallel chords. In this bridge the vertical "spacers" are very much apparent, and have the look of structural elements due to the "holes" in each span.¹⁶

The Deep Beam design used in this bridge is similar to the Vierendeel girder. A Dictionary of Civil Engineering describes the Vierendeel girder as "a Pratt Truss without the diagonal members and with rigid joints between top and bottom chords and their verticals. Many welded steel or reinforced-concrete trusses have been built in this way in Belgium and they are named after Prof. Vierendeel of that country."¹⁷ Clearly, the Black River Bridge has no diagonals, and the joints between the top and bottom chords and the verticals are rigid.

This bridge is also unique because of the material with which it was constructed. Certainly, steel would have been an appropriate material with which to build this bridge, but the specifications called for reinforced concrete. It is possible that concrete was proposed as an alternative to steel, which was difficult to find and costly to obtain in the aftermath of World War I. Such was the case in Cleveland during the construction of the Euclid theater in 1920. The structure was designed to utilize steel trusses in its roof support system, but the contractors discovered that they could not get the steel required when it was needed. As a result, they utilized for the roof four 82 foot 3 inch concrete trusses that were 10 feet deep. It was noted that the switch from steel to concrete saved \$4,000.¹⁸ It is also interesting to note that San Miguel County, in New Mexico, had four concrete truss bridges built between 1915 and 1920.¹⁹ The timing of that construction certainly could have been coincidental with the construction of the Cleveland theater and the Black River Bridge, but the timing is certainly consistent with the demands for steel in the World War I period and its immediate aftermath. Given these examples, nevertheless, it is logical to assume that

¹⁶William G. Murphy, discussion with John N. Vogel, 12 December 1992.

¹⁷John S. Scott, A Dictionary of Civil Engineering (Baltimore: Penguin Books, 1958; Revised, 1965), 338.

¹⁸"Concrete Trusses and Cantilever Girders in Theater," Engineering News-Record, 23 September 1920.

¹⁹Robert S. Newbery to John N. Vogel, photocopied page noting the four concrete truss bridges in San Miguel County, New Mexico, no date.

the decision to use reinforced concrete for the Black River Bridge was a reaction to the availability and cost of steel. Given that assumption, the bridge becomes a true product of its time -- and is significant as such.

PART II. ARCHITECTURAL INFORMATION

A. General Statement:

1. Architectural Character: The Black River Bridge was erected in 1921. It is a unique example of a multiple-span, reinforced concrete, Deep Beam bridge with holes.
2. Condition of Fabric: The historical integrity of this bridge is largely intact. The structural integrity, however, is deteriorating as the concrete degenerates and the subsequently exposed re-bar rusts.

B. Description:

The Black River bridge is a reinforced concrete, three span, Deep Beam bridge with holes, a design that very much resembles a Pony Truss. Built in 1921, the structure is 231 feet 5 inches long and carries a 20 foot .5 inch wide traffic deck. Each span is 77 feet long.

The bridge rests upon two concrete abutments and two piers. Presumably anchored on piles, the tapered piers are approximately 28 feet wide at water level. The deck is carried by nine deck beams and two one-half deck beams per span. The one-half beams are at the ends of each span, and are designed to facilitate the skewed positioning of those spans which was necessitated by the angle at which the bridge was built across the river. The dimensions of the beams, as well as the thickness of the deck, were unobtainable.

Because the entire structure is poured, reinforced concrete, individual structural components are not as discernable as on a conventional truss bridge. However, that element that most resembles a lower chord is 30.75 inches by 18 inches. The upper chord is straight across the top, although with inset holes (openings), its dimensions vary from 24.5 inches by 18 inches at the middle to 42 inches by 18 inches at each end. The two chords join and become solid panels at the end of each span, the slopes of which resemble inclined endposts. Eight holes are set in each span, thus creating the image of upper and lower chords. Generally, holes 1 and 8 are 47.5 inches high

by 48 inches, while holes 2 and 7 are 59.9 inches high by 57 inches and holes 3, 4, 5 and 6 are 65 inches high by 60 inches. The width of the seven vertical members created by the holes varies from between 2 feet 5 inches to 3 feet. All are 18 inches thick and utilize steel reinforcing that is .5 inch to 1 inch in diameter. The aggregate in the concrete varies from .25 inches in diameter to 2 inches.

This structure contains no ornamentation. It should be noted, however, that lights once adorned each of the structure's four corners, the bases of which still exist. As well, each hole has a railing, approximately 32 inches high, comprised of poured concrete 6 inch by 6 inch posts and a 6 inch by 6.5 inch top rail.

C. Setting:

The bridge is located approximately .75 miles north of USH 10, at that point where Grand Avenue crosses the Black River in the City of Neillsville. Oriented on a north/south axis, the bridge connects the farmland and partially wooded acreage of the Town of Pine Valley to the north with the city to the south. While no structures are immediately north of the bridge, the Neillsville filtration plant and several houses are adjacent on the south side.

PART III. SOURCES OF INFORMATION

A. Bibliography

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Prepared by:

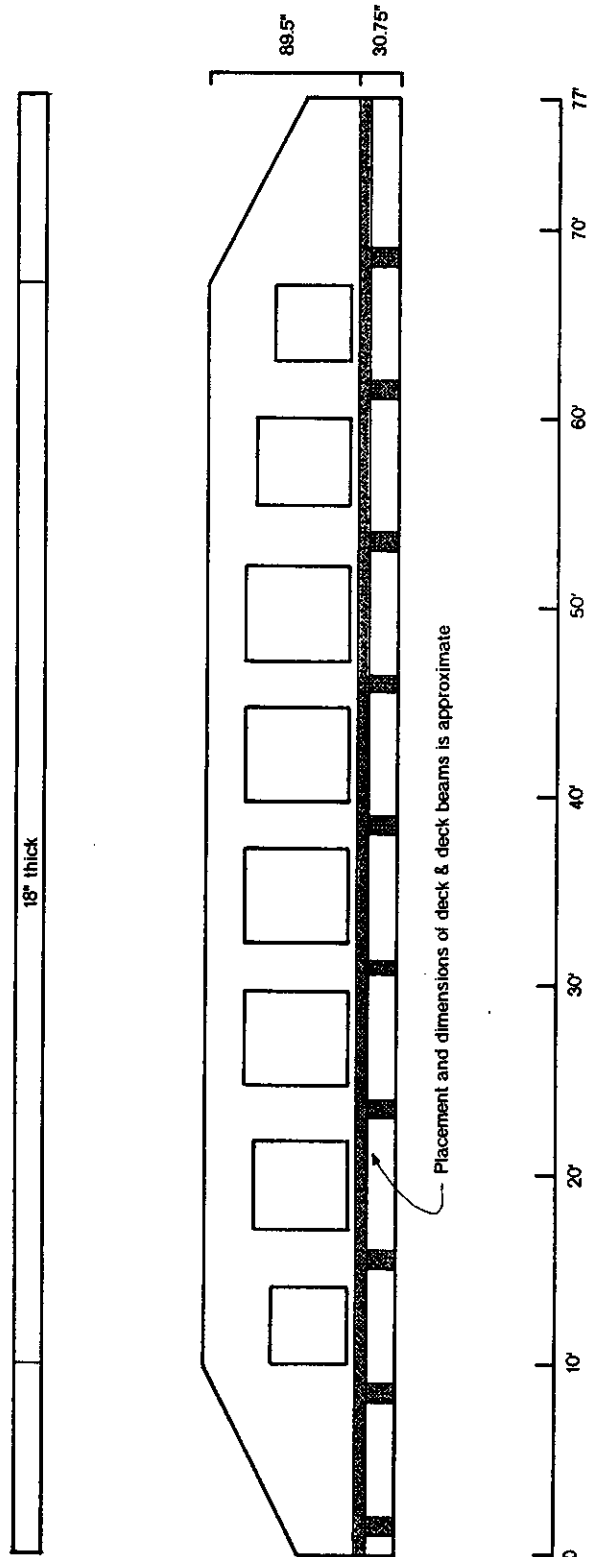
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Heritage Research, Ltd.
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10 February 1995

PART IV. PROJECT INFORMATION

This project has been sponsored by the Wisconsin Department of Transportation. Cooper Engineering, Rice Lake, Wisconsin, formally acted as the contracting agency. The project was undertaken by Dr. John N. Vogel, Senior Historian for Heritage Research, Ltd., who completed the photographic work and the architectural/technical data. He also edited and prepared the final document. Ms. Laura Abing and Mr. Kevin Abing, the firm's historian and assistant historian respectively, contributed to the local context and bridge history. Vogel's photographic activities were assisted by David J. Vogel.

South Span of Black River Bridge

(view to west)



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